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EVALUATION OF THE BNI RADIATION PROTECTION PLAN FOR DESIGN AND CONSTRUCTION, REVISION 5A

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Office of Safety Regulation

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PREFACE

As directed by Congress in Section 3139 of the *Strom Thurmond National Defense Authorization Act for Fiscal Year 1999,* the U.S. Department of Energy (DOE) established the Office of River Protection (ORP) at the Hanford Site to manage the River Protection Project (RPP), formerly known as the Tank Waste Remediation System. ORP is responsible for the safe storage, retrieval, treatment, and disposal of the high level nuclear waste stored in the 177 underground tanks at Hanford.

The initial concept for treatment and disposal of the high level wastes at Hanford was to use private industry to design, construct, and operate a Waste Treatment Plant (WTP) to process the waste. The concept was for DOE to enter into a fixed-price contract for the Contractor to build and operate a facility to treat the waste according to DOE specifications. In 1996, DOE selected two contractors to begin design of a WTP to accomplish this mission. In 1998, one of the contractors was eliminated, and design of the WTP was continued. However, in May 2000, DOE chose to terminate the privatization contract and seek new bidders under a different contract strategy. In December 2000, a team led by Bechtel National, Inc. was selected to continue design of the WTP and to subsequently build and commission the WTP.

A key element of the River Protection Project Waste Treatment Plant (RPP-WTP) is DOE regulation of safety through a specifically chartered, dedicated Office of Safety Regulation (OSR). The OSR reports directly to the ORP Manager. The regulation by the OSR is authorized by the document entitled *Policy for Radiological, Nuclear, and Process Safety Regulation of the River Protection Project Waste Treatment Plant Contractor* (DOE/RL-96-25) (referred to as the Policy) and implemented through the document entitled *Memorandum of Agreement for the Execution of Radiological, Nuclear, Process Safety Regulation of the RPP-WTP Contractor* (DOE/RL-96-26) (referred to as the MOA). These two documents provide the basis for the safety regulation of the RPP-WTP at Hanford.

The foundation of both the Policy and the MOA is that the mission of removal and immobilization of the existing large quantities of tank waste by the RPP-WTP Contractor must be accomplished safely, effectively, and efficiently.

The Policy maintains the essential elements of the regulatory program established by DOE in 1996 for the privatization contracts. The MOA clarifies the DOE organizational relationships and responsibilities for safety regulation of the RPP-WTP. The MOA provides a basis for key DOE officials to commit to teamwork in implementing the policy and achieve adequate safety of RPP-WTP activities.

The Policy, the MOA, the RPP-WTP Contract, and the four documents incorporated in the Contract define the essential elements of the regulatory program being executed by the OSR. The four documents incorporated into the Contract (and also in the MOA) are as follows:

Concept of the DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor, DOE-96-0005,

DOE Process for Radiological, Nuclear, and Process Safety Regulation of the RPP Waste Treatment Plant Contractor, DOE/RL-96-0003,

Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor, DOE/RL-96-0006, and

Process for Establishing a Set of Radiological, Nuclear, and Process Safety Standards and Requirements for the RPP Waste Treatment Plant Contractor, DOE/RL-96-0004.

DOE patterned its safety regulation of the RPP-WTP Contractor to be consistent with the concepts and principles of good regulation (reliability, clarity, openness, efficiency, and independence) used by the Nuclear Regulatory Commission (NRC). In addition, the DOE principles of integrated safety management were built into the regulatory program for design, construction, operation, and deactivation of the facility. The regulatory program for nuclear safety permits waste treatment services to occur on a timely, predictable, and stable basis, with attention to safety consistent with that which would occur from safety regulation by an external agency. DOE established OSR as a dedicated regulatory organization to be a single point of DOE contact for nuclear safety oversight and approvals for the WTP Contractor. The OSR performs nuclear safety review, approval, inspection, and verification activities for ORP using the NRC principles of good regulation while defining how the Contractor shall implement the principles of standards-based integrated safety management.

A key feature of this regulatory process is its definition of how the standards-based integrated safety management principles are implemented to develop a necessary and sufficient set of standards and requirements for the design, construction, operation, and deactivation of the RPP-WTP facility. This process meets the expectations of the DOE necessary and sufficient closure process (subsequently renamed Work Smart Standards process) in DOE Policy 450.3, *Authorizing Use of the Necessary and Sufficient Process for Standards-based Environment, Safety and Health Management*, and is intended to be a DOE approved process under DOE Acquisition Regulations, DEAR 970.5204-2, *Laws, Regulations and DOE Directives*, Section (c). DOE approval of the contractor-derived standards is assigned to the OSR.

The RPP-WTP Contractor has direct responsibility for WTP safety. DOE requires the Contractor to integrate safety into work planning and execution. This integrated safety management process emphasizes that the Contractor's direct responsibility for ensuring that safety is an integral part of mission accomplishment. DOE, through its safety regulation and management program, verifies that the Contractor achieves adequate safety by complying with approved safety requirements.

EXECUTIVE SUMMARY

The River Protection Project Waste Treatment Plant Contract[1] requires that the Contractor submit a revised Radiation Protection Program (RPP) for U.S. Department of Energy approval prior to the initiation of construction activities. The Contractor's "Radiation Protection Program for Design and Construction," Rev. 5A, was submitted as required by contract prior to the initiation of construction activities. The attached report documents the Office of Safety Regulation (OSR) evaluation of the RPP, Rev. 5A, and the evaluation of the adequacy of responses to two question sets, and their associated proposed RPP page changes, submitted during the course of the RPP review. The RPP, Rev. 5A, was developed to incorporate an expanded scope of activities (construction) and to reflect various changes in approach compared to that adopted by the previous Contractor.

The OSR evaluated the RPP using Criteria (a) and (b) from the RPP review guidance document, RL/REG-98-11, *Guidance for Review of the RPP-WTP Contractor Radiation Protection Program Document Required by 10 CFR 835, Occupational Radiation Protection*.

Criterion (a) states:

> "The Contractor's RPP provides reasonable assurance that the activity will be conducted in compliance with the provisions of 10 CFR 835. There is also reasonable assurance that the Contractor can effectively manage and administer the RPP to achieve continued compliance with 10 CFR 835."

10 CFR 835 requires that the RPP address each 10 CFR 835 requirement. The RPP, Rev. 5A, was reviewed against Criterion (a) of RL/REG-98-11 to determine if each requirement in 10 CFR 835 was adequately addressed and to determine if plans, schedules, and measures are in place for achieving compliance with each requirement. Details of the review of each subpart of 10 CFR 835 are included in Section 4.1 of this document.

Criterion (b) states:

> "The content of the RPP conforms to the Contractor's authorization basis documentation."

The RPP, Rev. 5A, also was reviewed against Criterion (b) to determine if the content of the RPP conforms to the Contractor's authorization basis (AB) documentation. Section 4.2 of this document presents the evaluation of general RPP issues and a discussion of OSR findings with respect to consistency of the RPP with other AB documents.

The reviewers determined that RPP, Rev 5A, met the review Criteria (a) and (b) established in RL/REG-98-11. The reviewers found that the RPP addressed all applicable requirements of 10

[1] Contract DE-AC27-01RV14136 between DOE and BNI, dated December 11, 2000.

CFR 835 and contained acceptable measures for achieving compliance with the requirements, with consideration of the Contractor's responses to the questions posed by OSR and the associated RPP page changes. Based on the results of the review, the Contractor's letters addressing the OSR reviewers' questions, and the Contractor's proposed RPP page changes, the reviewers recommend that the Safety Regulation Official approve the Contractor's RPP, Rev 5A.

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EVALUATION OF THE BNI RADIATION PROTECTION PROGRAM FOR DESIGN AND CONSTRUCTION, REVISION 5A

1.0 INTRODUCTION

This report documents the Office of Safety Regulation (OSR) evaluation of the Bechtel National, Inc. (BNI) "Radiation Protection Program for Design and Construction," Rev. 5A. This revision represents a significant change to the Radiation Protection Program (RPP) for Design, Rev. 5. Rev. 5A was developed to incorporate an expanded scope of activities (i.e., construction) and to reflect various changes in approach compared to those adopted by BNFL Inc. (the previous Contractor).[2] BNI submitted the revised RPP to the OSR for review on November 28, 2000.[3] OSR notified the Contractor[4] on December 15, 2000, that the content of its submittal was sufficient for the OSR to perform a detailed review.[5]

2.0 BACKGROUND

The River Protection Project Waste Treatment Plant (RPP-WTP) Contract requires that the Contractor submit an RPP for approval by the U.S. Department of Energy (DOE) prior to the initiation of construction activities. Additionally, 10 CFR 835 states that, "A DOE activity shall be conducted in compliance with a documented RPP as approved by the DOE" [Sec. 835.101(a)]; "the content of each RPP shall be commensurate with the nature of the activities performed" [Sec. 835.101(c)]; and "an update of the RPP shall be submitted to DOE prior to the initiation of a task not within the scope of the RPP" [Sec. 835.101(g)(2)]. Currently the RPP, Rev. 5, addresses only design activities. Because of existing contractual and regulatory requirements, a revised RPP was required to begin construction activities at the RPP-WTP site.

As required by 10 CFR 835, the RPP will address, but not necessarily be limited to, each of the 10 CFR 835 requirements. This RPP consists of a compliance matrix that addresses plans, schedules, and measures for achieving compliance with each 10 CFR 835 requirement, preceded by limited discussion of the Contractor's program. Both the discussion and the compliance matrix are considered a part of the RPP, and any plans and measures contained therein are considered commitments by the Contractor.

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[2] Although Rev. 5 of the RPP was submitted by CH2M Hill Hanford Group (CHG), it contained primarily minor changes to the OSR-approved Rev. 3 for design (a Rev. 4 was submitted by BNFL but ultimately retracted) in order to recognize the change in contractors. Therefore, Rev. 5A represents the first significant change to the currently approved RPP (Rev. 5).

[3] 01-RU-0032, Letter from J. O. Honeyman to W. J. Taylor, ORP, "Submission of the Revised Radiation Protection Program and Request for Closure of Authorization Basis Amendment Request ABAR-W375-00-00011 Through Submission of Authorization Basis Change Notice ABCN-W375-00-00049," CCN 016569C, dated November 28, 2000.

[4] During the course of this review, BNI assumed responsibility for the RPP under a new contract; therefore, the term "Contractor" indicates either CHG or BNI, depending on the timeframe.

[5] 01-RU-0038, Letter from W. J. Taylor to M. P. DeLozier, CHG, "Contract No. DE-AC06-99RL14047 - Acceptability Review of the CH2M Hill Hanford Group, Inc. (CHG) Radiation Protection Program (RPP) for Design and Construction, Rev. 5A," dated December 15, 2000.

3.0 RPP REVIEW AND EVALUATION PROCESS

The OSR evaluated the RPP using applicable criteria from RL/REG-98-11, *Guidance for Review of the RPP-WTP Contractor Radiation Protection Program Document Required by 10 CFR 835, Occupational Radiation Protection*. This document is an updated version of the original review guide, resulting from a November 4, 1998, amendment to 10 CFR 835 and from lessons learned during use of the original review guide.

The measures the Contractor identified in the RPP for achieving compliance with 10 CFR 835 were reviewed using the applicable criteria provided in the review guidance. These criteria were as follows:

- Criterion (a): The Contractor's RPP provides reasonable assurance that the activity will be conducted in compliance with the provisions of 10 CFR 835. There is also reasonable assurance that the Contractor can effectively manage and administer the RPP to achieve continued compliance with 10 CFR 835.

- Criterion (b): The content of the RPP conforms to the Contractor's authorization basis (AB) documentation.

The review guidance includes attributes for these criteria to assist reviewers in determining the acceptability of the proposed measures to achieve compliance with the applicable 10 CFR 835 requirements. These attributes do not represent additional requirements but are considerations that assist in determining whether the Contractor input has satisfied a criterion. In general, there is an expectation that the measures for achieving compliance be identified, complete, implementable, and based on accepted standards (e.g., industry codes and standards, DOE Implementation Guides (IGs), U.S. Nuclear Regulatory Commission Regulatory Guides, or international standards).

Meeting the applicable review criteria ensures that the measure being evaluated, when properly implemented, will achieve compliance with 10 CFR 835 and the contract. Some 10 CFR 835 requirements are prescriptive; in these cases, a policy statement or commitment in the RPP is an acceptable measure for achieving compliance with that requirement. Non-prescriptive requirements in 10 CFR 835 may require additional explanation or other implementing provisions to describe the measure.

In addition to the review guidance, the OSR reviewers followed RL/REG-2000-16, *Radiation Protection Program (RPP) Planning Handbook*. This handbook outlined the review schedule and protocol.

BNI submitted the revised RPP to the OSR for review on November 28, 2000. The OSR performed an acceptability review of the RPP as required by RL/REG-98-11 and notified BNI on December 15, 2000, that the content of its submittal was sufficient for a detailed review. The OSR then initiated a comprehensive review of the submittal. Several questions were identified during the initial stages of this review, and these were transmitted to the Contractor as Question

Set One.[6] The OSR subsequently received a response from the Contractor to these questions.[7] The OSR developed additional questions as the review progressed, and these were transmitted as Question Set Two.[8] The OSR subsequently received a response from the Contractor to these questions.[9] In addition, the OSR requested proposed RPP page changes for Contractor's responses to Question Sets One and Two.[10] These page changes were subsequently submitted by the Contractor.[11]

4.0 EVALUATION RESULTS

This section presents the results of the OSR evaluation. This evaluation considers the responses by the Contractor to Question Sets One and Two and their proposed RPP page changes that address those responses. Section 4.1 presents the evaluation of the RPP with respect to each 10 CFR 835 requirement summarized by Subparts A through N. Section 4.2 presents the evaluation of general RPP issues and a discussion of the OSR findings with respect to consistency of the RPP with other AB documents.

4.1 Evaluation of Specific 10 CFR 835 Requirements

The RPP provides plans, schedules, and measures for ensuring compliance with each of the 10 CFR 835 requirements that apply to the Contractor's design and construction activities. These plans, schedules, and measures were evaluated primarily based on review Criterion 5(a); this criterion requires that the RPP provide reasonable assurance that the Contractor's activities will be conducted according to the 10 CFR 835 requirements.

The OSR noted that the BNI RPP relied heavily on the Tank Farms Radiological Control Manual (TFRCM) as the principal implementing document for many of the 10 CFR 835 requirements. In these cases, the TFRCM often simply repeated the requirement from 10 CFR 835. Although this approach is acceptable for prescriptive requirements, many requirements are not prescriptive and additional implementing provisions are appropriate in the RPP. Many of the OSR's

[6] 01-OSR-0003, ORP letter from W. J. Taylor to M. P. DeLozier, CHG, "…Office of Safety Regulation (OSR) Questions Concerning the CH2M Hill Hanford Group, Inc. (CHG) Radiation Protection Program (RPP) for Design and Construction, Revision 5A," dated January 12, 2001.
[7] 01-OSR-0025, CHG letter from J. O. Honeyman to W. J. Taylor, ORP, "…CH2M Hill Hanford Group Inc., Response to the Office of Safety Regulation Questions Regarding the Radiation Protection Program, Revision 5A," CCN 017637C, dated January 24, 2001.
[8] 01-OSR-0017, ORP letter from W. J. Taylor to M. P. DeLozier, CHG, "…Office of Safety Regulation (OSR) Question Set Two Concerning the CH2M Hill Hanford Group, Inc. (CHG) Radiation Protection Program (RPP) for Design and Construction, Revision 5A," dated February 1, 2001.
[9] 01-OSR-0080, BNI letter from R. F. Naventi to W. J. Taylor, ORP, "…Response to the Office of Safety Regulation Second Set of Questions Regarding the Radiation Protection Program, Revision 5A," CCN 018459, dated March 5, 2001.
[10] 01-OSR-0094, ORP letter from W. J. Taylor, to R. F. Naventi, BNI, "…Additional Request Regarding the Radiation Protection Program…," dated March 21, 2001.
[11] 01-OSR-0117, BNI letter from R. F. Naventi to W. J. Taylor, ORP, "…Response to Office of Safety Regulation Additional Request Regarding the Radiation Protection Program…," CCN 019243, dated April 3, 2001.

questions to the Contractor reflected concern or uncertainty regarding the additional, or in some cases the lack of, implementing provisions identified by the Contractor.

The OSR evaluation of each of the plans, schedules, and measures identified by the Contractor is summarized below. In order to avoid an unnecessarily lengthy report that provides the evaluation of each 10 CFR 835 requirement individually, the evaluation is presented by 10 CFR 835, Subpart (excluding Subpart D, which is reserved). The transmittals that provide the OSR questions (and Contractor responses) pertaining to specific 10 CFR 835 requirements, together with appropriate background information, are listed in Section 6, "References," of this document.

4.1.1 Subpart A – General Provisions

This subpart to 10 CFR 835 contains general information such as scope of the rule and definitions. The RPP addresses each requirement of this subpart in Requirements 1-10 of the Requirements Matrix. The OSR had a minor question (RPP5A-Q12) with respect to a statement in the RPP that addressed the applicability of the definitions. The Contractor answered this question adequately. Additionally, the Contractor chose to provide definitions in the RPP for some terms that are not listed in 10 CFR 835. The OSR questions pertaining to these definitions are discussed below under the relevant subparts.

The information presented in the RPP, the reply to the above-referenced questions, and the Contractor's proposed page changes provide reasonable assurance that the Contractor's activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart A.

4.1.2 Subpart B – Management and Administrative Requirements

This subpart of 10 CFR 835 contains requirements pertaining to (1) a documented RPP including content, scope, and changes to an RPP; (2) internal audits of radiation protection programs; (3) qualifications of individuals; and (4) development of written procedures. The submission of the RPP, Rev. 5A, was made pursuant to the requirements of this subpart due to the expanded scope of work to include construction activities for the RPP-WTP. The RPP addresses the requirements of this subpart in Sections 1, "Introduction"; 4, "Applicability"; and 5, "Graded Approach" of the text portion of the RPP and in Requirements 11-22 of the Requirements Matrix.

The Contractor addressed the program requirements of this subpart through its RPP commitments and commitments made in responses to Question Sets One and Two. The scope of activities was expanded to include defined construction activities. A requirements matrix was developed to present plans, schedules, and measures for achieving compliance with each requirement of Part 835. Measures for developing procedures and performing internal audits were presented, as were commitments to specific articles of the TFRCM regarding the education, training, and skills of responsible individuals. Several questions related to this subpart were raised. These questions addressed the scope of activities under the RPP (questions RPP5A-Q14 and RPP5A-Q22); the application of the Quality Assurance Program (QAP) to procedures and

audits (questions RPP5A-Q3 and RPP5A-Q9), and measures to ensure that individuals in responsible positions possess the requisite education, training, and skills (personnel qualifications – question RPP5A-Q23). In response to RPP5A-Q14, the Contractor clarified that the statements in Requirement 13 commit the Contractor to ensure that all subcontractors and suppliers comply with the requirements of the RPP when performing work within the scope identified in Section 4 of the RPP. Also, related to the RPP scope in response to RPP5A-Q22, the Contractor amended the RPP to clearly identify that work associated with the transfer piping tie-in to Tank 241-QP-106 was not within the RPP scope. In response to other questions, the Contractor stated that procedure development/maintenance and the performance of audits would be conducted in accordance with the QAP; the Contractor amended the RPP accordingly. The clarifications and information presented adequately addressed OSR's concern related to the scope of the RPP and the application of the QAP to procedures and audits.

In response to a question (RPP5A-Q2A) not directly related to this subsection, the Contractor stated that it is committing to the entire TFRCM to form the basis of the Radiological Controls Program and that articles from the TFRCM cited in the RPP are intended to show implementing linkage and compliance with 10 CFR 835. This information assisted in the evaluation of the RPP with respect to 10 CFR 835.103, "Education, training, and skills." The RPP Matrix Requirement 21 addressing education, training, and skills referred to Article 142.2 of the TFRCM for the qualifications of the Radiological Control Manager (RCM). Article 142.2 provides minimal information other than the individual shall have technical competence and experience. However, Article 142.3 of the TFRCM provides an expanded and adequate discussion of the qualifications of the RCM. Although the RPP does not reference Article 142.3, it is the Contractor's intent (as indicated in response to RPP5A-Q2A) to apply the criteria of this article to the RCM position. This understanding along with the reply to RPP5A-Q23 adequately addressed OSR's concern related to qualifications of individuals.

The information presented in the RPP and the reply to the above-referenced questions provide reasonable assurance that the Contractor's activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart B.

4.1.3 Subpart C – Standards for Internal and External Exposure

This subpart to 10 CFR 835 contains requirements pertaining to the control of dose to general employees, declared pregnant women, minors, and members of the public during access to a controlled area. The RPP addresses each requirement of this subpart in Requirements 23-42 of the Requirements Matrix. Reference is made to numerous articles of the TFRCM as the provisions to implement the requirements of Subpart C. The RPP indicates that the Contractor will implement the requirements of 10 CFR 835.202 through the Contractor's dosimetry program and subcontractor services to limit the occupational dose to general employees. In response to question RPP5A-Q4, the Contractor provided the intended major sub-elements of its dosimetry program and a schedule that indicated the procedures will be approved, implemented, and training completed prior to June 25, 2001. In response to question RPP5A-Q16, the Contractor described its plans and measures to ensure subcontractors will be in compliance with 10 CFR 835 requirements.

Subpart C permits use of planned special exposures, provided several conditions are satisfied. Although the Contractor committed to TFRCM Articles 213.3 and 722.12, it stated that it does not anticipate the need for planned special exposures during design and construction activities.

Exposure to declared pregnant workers will be controlled in accordance with TFRCM Article 215 and the Contractor dosimetry program procedures.

Exposure to minors and members of the public permitted to enter controlled areas will be limited pursuant to TFRCM Articles 213.3, 214, and the dosimetry program. In response to question RPP5A-Q17, the Contractor also described its administrative controls to minimize the likelihood of an individual entering a controlled area and receiving a dose above the established limits.

Based on the Contractor's commitment to implement several articles from the TFRCM, its dosimetry program, and control of subcontractors, there is reasonable assurance that internal and external doses will be controlled in accordance with the requirements of 10 CFR 835, Subpart C.

4.1.4 Subpart E – Monitoring of Individuals and Areas

This subpart to 10 CFR 835 contains requirements pertaining to the monitoring of dose to individuals, the performance of air monitoring, and receipt and monitoring of packages containing radioactive material. The RPP addresses each requirement of this subpart in Requirements 43-54 of the Requirements Matrix. Reference is made to numerous articles of the TFRCM as the provisions to implement the requirements of Subpart E. In addition, the Contractor indicated that it would establish monitoring and workplace air sampling programs by June 25, 2001, in response to OSR question RPP5A-Q4.

In response to RPP5A-Q10, the Contractor stated that its monitoring instruments will be calibrated in accordance with the guidance presented in ANSI N323 and N323A, "Radiation Protection Instrumentation Test and Calibration," through a memorandum of understanding (MOU) with Pacific Northwest National Laboratory. While the Contractor did not commit to several subsections of the TFRCM that provide measures to reduce the chance of noncompliance with the instrument and equipment requirements, it did commit to TFRCM Article 551.5, which is intended to ensure that 10 CFR 835.401(b) requirements are met.

Question RPP5A-Q13 focused on the frequency of radiological monitoring during construction activities. The Contractor responded by indicating, "Part 5 of Chapter 5 of HNF-5183 establishes the monitoring frequency." Part 5 of Chapter 5 of HNF-5183 was found to address radiological monitoring and surveys and contained information on survey frequencies.

10 CFR 835.402(a)(1) requires monitoring of individuals by personnel dosimetry if they are "likely to receive" dose equal to or in excess of specified quantities. In response to RPP5A-Q15, the Contractor stated that, "When professional judgment is utilized, the decision will be documented, reviewed, and approved on a technical equivalency document." While this commitment, and additional clarification provided by the Contractor in response to the letter provides reasonable assurance that the appropriate individuals will be monitored when required,

the correct technical DOE term is "technical basis document." The correct use of the term is important because misuse of technical terms could become a source of future conflict (e.g., such terms come with certain expectations). Correction of the term was discussed with BNI during a teleconference held on April 9, 2001. Based on this discussion, BNI committed to change "technical equivalency" to "technical basis" in Appendix A, "Other Implementing Provisions" for Requirements 45, 47, and 49 of the RPP.

RPP5A-Q17 pointed out a minor omission in the Contractor's response to 10 CFR 835.402(c) and questioned where the "administrative controls" described in the RPP were documented. In response to the question, the Contractor corrected the minor omission and stated that TFRCM Article 211 specifies the administrative control level and the authorization process.

The Contractor stated in its response to RPP5A-Q18 that TFRCM Article 423 and a procedure titled, "Radioactive Waste/Material Shipments," will ensure that packages of radioactive material will be surveyed on receipt to comply with the requirements in 10 CFR 835.405. As indicated by the Contractor's proposed RPP page change response, this will be implemented through the BNI posting and labeling program.

Based on the Contractor’s commitment to implement articles from the TFRCM, its monitoring and workplace air sampling programs, and commitments made in response to the OSR questions, there is reasonable assurance that radiological monitoring will be conducted in accordance with the requirements of 10 CFR 835, Subpart E.

4.1.5 Subpart F – Entry Control Program

This subpart to 10 CFR 835 contains requirements pertaining to the control of personnel entering radiological areas. The RPP addresses each requirement of this subpart in Requirements 55-63 of the Requirements Matrix. Reference is made to numerous articles of the TFRCM as the provisions to implement the requirements of Subpart F. In response to question RPP5A-Q4, BNI stated that access control provisions would be established during the design of the facility through its existing as low as reasonably achievable (ALARA) program. In that response, BNI also stated that three implementing procedures (Access Control, High Radiation Area Physical Controls, and Radiation Generating Device Control) would be implemented during construction.

Since BNI expects that subcontractors will be used throughout the construction process, the Contractor stated in response to RPP5A-Q16 that its procurement procedure will be used to ensure that all purchase requisitions include applicable safety or regulatory requirements such as those found in 10 CFR 835. This is particularly relevant to an effective entry control program since temporary radiological areas may be established during the construction phase.

Based on the Contractor’s commitment to implement articles from the TFRCM, its procedures, and commitments made in response to the OSR questions, there is reasonable assurance that radiological area entry control activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart F.

4.1.6 Subpart G – Posting and Labeling

This subpart of 10 CFR 835 contains requirements pertaining to posting of areas for specific radiological conditions including: controlled areas; radiation, high radiation, and very high radiation areas; airborne radioactivity areas; contamination and high contamination areas; and radioactive material areas. It also contains requirements pertaining to labeling items and containers. The RPP addresses each requirement of this subpart in Requirements 64-75 of the Requirements Matrix. Reference is made to numerous articles of the TFRCM as the provisions to implement the requirements of Subpart G. In addition, in the description for compliance with Requirements 73 and 74, the Contractor identified its intent to develop and implement a posting and labeling program. Question RPP5A-Q4 identified several programs listed in the RPP, including the posting and labeling program, and asked for further definition of the programs and the status of their development. The Contractor's reply identified three sub-elements of the posting and labeling program and indicated the program was under development and provided a completion schedule. This information was subsequently included as part of a new appendix (Appendix C) to the RPP.

Based on the Contractor's commitment to implement the referenced articles of the TFRCM and its commitment to develop a posting and labeling program, there is reasonable assurance that the Contractor's activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart G.

4.1.7 Subpart H – Records

This subpart of 10 CFR 835 contains requirements pertaining to record keeping, including individual monitoring records, other monitoring records, and miscellaneous administrative records. The RPP addresses the requirements of this subpart in Requirements 76-95 of the requirements matrix. Reference is made to numerous articles of Chapter 7, "Radiological Records," of the TFRCM as the provisions to implement Subpart H. The Contractor also had indicated that records required by this subpart would be maintained in accordance with DOE G 441.1-11. The OSR questioned whether record keeping would be in accordance with the QAP (question RPP5A-Q19). The OSR noted that the commitment to maintain records in accordance with DOE G 441.1-11 was not consistent with the Contractor's reply to question RPP5A-Q2C, wherein the Contractor stated that it does not commit to the DOE Implementing Guides (IGs). In reply to RPP5A-Q19, the Contractor modified the RPP to remove the reference to DOE G 441.1-11 and replaced it with a commitment to maintain records in accordance with the QAP. The OSR also questioned (RPP5A-Q20) the term "reportable dose" as defined in Requirement 80 of the requirements matrix. The OSR found the definition vague. In its reply to RPP5A-Q20, the Contractor stated that the definition added no value and removed it from the RPP.
Based on the Contractor's commitment to implement the referenced articles of the TFRCM and its commitment to utilize the record keeping measures identified in the QAP, there is reasonable assurance that the Contractor's activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart H.

4.1.8 Subpart I – Reports to Individuals

This subpart of 10 CFR 835 contains requirements pertaining to the reporting of radiation exposure data to individuals. The RPP addresses each requirement of this subpart in Requirements 96-100 of the requirements matrix. Reference is made to Article 781, "Reports to Individuals," and Article 732 (regarding termination reports) of the TFRCM as the provisions to implement Subpart I. The RPP identifies the Contractor's dosimetry program and subcontractor's services as other implementing provisions to comply with this subpart. Question RPP5A-Q4 identified several programs listed in the RPP, including the dosimetry program, and asked for further definition of the programs and the status of their development. The Contractor's reply to this question indicates that the reference to the dosimetry program is primarily intended as the source of reporting information.

The OSR had a general concern (question RPP5A-Q16) regarding the Contractor's plans or measures to ensure that subcontractors will be in compliance with 10 CFR 835. Because subcontractors likely will have their own dosimetry programs, this question was relevant to Subpart I. The Contractor's reply stated that a specific procedure of the procurement process requires formal review and approval of all purchase requisitions to ensure the requirements of 10 CFR 835 are included and the Contractor amended Section 4, "Applicability," of the RPP accordingly.

Based on the Contractor's commitment to implement the referenced articles of the TFRCM and its provision to ensure 10 CFR 835 requirements are addressed in the procurement process, there is reasonable assurance that the Contractor's activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart I.

4.1.9 Subpart J – Radiation Safety Training

This subpart of 10 CFR 835 contains requirements pertaining to radiation safety training that will be provided to workers, including timeliness, topics, and examinations. The RPP addresses each requirement of this subpart in Requirements 101-105 of the Requirements Matrix and in Section 5, "Graded Approach," of the text portion of the RPP. The Contractor intends to apply a graded approach to radiation safety training, i.e., the extent of training is based on considerations of the magnitude of the hazard, the complexity of the situation, and the length of time the situation exists. This graded approach is consistent with 10 CFR 835.901(a), which allows training to be commensurate with the hazards and the required controls. The RPP references several articles from Chapter 6, "Training and Qualification," of the TFRCM as well as the RPP-WTP training program and use of subcontractors as the implementing provisions for this subpart.

Question RPP5A-Q4 identified several programs listed in the RPP, including the RPP-WTP training program, and asked for further definition of the programs and the status of their development. The Contractor's reply identified a Code of Practice for Training and a Personnel Orientation and Training procedure as the existing elements of the training program, provided a related revision schedule for these documents, and included this information in a new appendix (Appendix C) to the RPP. Question RPP5A-Q11 asked for further information on the "two-

tiered training approach" described in the RPP. The Contractor replied that the two-tiered approach was part of the Code of Practice and consisted of general radiation safety training and facility-specific training. In response to other aspects of RPP5A-Q11, the Contractor appropriately clarified that the application of 10 CFR 835.901 to facility design staff was unlikely and training associated with radiation sources for nondestructive testing was outside the regulatory framework of 10 CFR 835. The OSR had a general concern (question RPP5A-Q16) regarding the Contractor's plans or measures to ensure that subcontractors will be in compliance with 10 CFR 835. Since the use of subcontractors was identified as an implementing provision for the training program, RPP5A-Q16 was pertinent to Subpart J. The Contractor's reply stated that a specific procedure of the procurement process requires formal review and approval of all purchase requisitions to ensure the requirements of 10 CFR 835 are included and the Contractor amended Section 4, "Applicability," of the RPP. The Contractor's reply to OSR's questions related to training adequately resolved concerns related to this subpart.

Based on the current training program and the commitment to perform needed revisions, the commitment to implement the referenced articles of the TFRCM, and the provision to ensure 10 CFR 835 requirements are addressed in the procurement process, there is reasonable assurance that the Contractor's activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart J.

4.1.10 Subpart K – Design and Control

This subpart of 10 CFR 835 contains requirements pertaining to design and workplace measures to maintain radiation exposures in controlled areas ALARA, with emphasis on design features, including the presentation of specific design objectives. The RPP addresses each requirement of this subpart in Requirements 106-113 of the requirements matrix. Reference is made to Article 128, "Facility Modifications and Radiological Design Considerations," and several other articles of the TFRCM and to PL-W375-N00005, "RPP-WTP ALARA Program," as the implementing provisions for this subpart.

The currently approved RPP (Rev. 5) was developed to support design activities and contained a thorough description of measures to ensure that ALARA was appropriately included in the design of the RPP-WTP facility. However, the RPP for Design and Construction, Rev. 5A, contained significantly less descriptive information on ALARA design and had the appearance that the RPP would result in a decrease in effectiveness for ALARA design. Question RPP5A-Q1 addressed this potential issue. The Contractor's reply stated that commitments beyond those identified in 10 CFR 835 are not required and that the referenced TFRCM articles and PL-W375-N00005 (which describes the essential elements of ALARA design) fully implemented the 10 CFR 835 requirements. Thus, the Contractor concluded that the effectiveness of the RPP was not reduced. The OSR subsequently reviewed PL-W375-N0005, "RPP-WTP ALARA Program," and several of its referenced procedures and accepted the Contractor's conclusion.

Based on the Contractor's commitment to implement the referenced articles of the TFRCM and PL-W375-N00005, there is reasonable assurance that the Contractor's activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart K.

4.1.11 Subpart L – Radioactive Contamination Control

This subpart to 10 CFR 835 contains requirements pertaining to the control of areas, material, and equipment contaminated with radioactive material. The RPP addresses each requirement of this subpart in Requirements 114-121 of the requirements matrix. Reference is made to numerous articles of the TFRCM as the provisions to implement the requirements of Subpart L. In response to question RPP5A-Q4, the Contractor provided the intended major sub-elements of its contamination control program and a schedule that indicated the procedures would be approved, implemented, and training completed prior to June 25, 2001.

The focus of Subpart L is on control of fixed and removable surface radioactive material contamination. Since construction activities may be impacted by legacy contamination that is not characterized as surface contamination, the Contractor was asked (question RPP5A-Q8) to address its provisions for determining whether radioactive contamination, other than surface contamination, will be controlled in a manner to prevent inadvertent dispersal. In response, BNI committed to develop three procedures dealing with outdoor contamination based on Hanford Site standards and will implement these procedures prior to the start of construction.

In response to RPP5A-Q21, the Contractor deleted its discussion involving, "a graded approach that balances the relevant factors such as biological vectors." It replaced it with, "Legacy contamination that is transported by an environmental or biological vector is not enforceable under 10 CFR 835.1102(a). However, any detectable radioactivity will be controlled in accordance with the monitoring program." While the Contractor's position on enforceability may have merit in some situations, the OSR's position is the Contractor is expected to monitor for legacy contamination and implement its contamination control program to comply with 10 CFR 835 requirements when radioactivity is detected. Therefore, the OSR found that the Contractor's submittals did not adequately specify the measures that will be used to control legacy contamination if such contamination is discovered during construction activities. This issue was discussed with BNI during a teleconference held on April 19, 2001. Based on this concern, BNI committed to change Table 1, Requirement 117 and Appendix A, Requirement 117, to add the following statement to the end of the partial quote from EGS 00-01, "Should legacy contamination be discovered, it will be controlled in accordance with the RPP."

Based on the Contractor's commitment to implement several articles from the TFRCM through its contamination control program and implementing procedures and the additional commitments discussed above, there is reasonable assurance that radioactive contamination will be controlled in accordance with the requirements of 10 CFR 835, Subpart L.

4.1.12 Subpart M – Sealed Radioactive Source Control

This subpart to 10 CFR 835 contains requirements pertaining to the control of sealed radioactive sources. The RPP addresses each requirement of this subpart in Requirements 122-127 of the Requirements Matrix. Reference is made to elements of Article 431 of the TFRCM as the measures to implement the requirements of Subpart M. In response to question RPP5A-Q4, the Contractor provided the intended major sub-elements of its source control program and a

schedule that indicated the procedures would be approved, implemented, and training completed prior to June 25, 2001.

In response to question RPP5A-Q11, the Contractor stated in part, "…, since radiation generating devices are controlled by 10 CFR 34 not 10 CFR 835, the policy and commitments basis is not listed in the RPP." This position is acceptable to the extent that the Contractor uses a Nuclear Regulation Commission, Agreement State, or State licensee to support the construction activity. Use of a radiation generating device, as defined in DOE G 441.1-5, "Radiation-Generating Devices Guide," by a non-licensee would be subject to the requirements of 10 CFR 835.

Based on the Contractor's commitment to implement Article 431 from the TFRCM through its source control program and implementing procedures, there is reasonable assurance that radioactive sealed sources will be controlled in accordance with the requirements of 10 CFR 835, Subpart M.

4.1.13 Subpart N – Emergency Exposure Situations

This subpart to 10 CFR 835 contains requirements pertaining to the control and measurement of occupational dose during emergency situations. The RPP addresses each requirement of this subpart in Requirements 128-137 of the Requirements Matrix. It also addresses requirements for workers whose doses have exceeded the routine annual limits due to exposures incurred during an emergency. In general, it is highly unlikely that these requirements will apply to the RPP-WTP facility during design and construction. As outlined in the RPP, the TFRCM serves as the principal implementing document for these requirements should they apply. Five questions (RPP5A-Q24, -Q26, -Q27, -Q28, and -Q29) were raised by the OSR concerning consistency of the requirements with statements in the SRD; this issue will be addressed in Section 4.2.

The information presented in the RPP and the reply to the above-referenced questions provide reasonable assurance that the Contractor's activities will be conducted in accordance with the requirements of 10 CFR 835, Subpart N.

4.2 Evaluation of General Issues and Consistency with Authorization Basis Documents

During the course of this review, the OSR identified a number of questions (i.e., RPP5A-Q24 through Q29, -Q31, -Q32, and -Q34) that did not pertain to specific 10 CFR 835 requirements but were necessary for developing reasonable assurance that the objectives of 10 CFR 835 and requirements of the contract would be met. These questions, the Contractor's responses, and the OSR's evaluation are summarized in this section. This section also presents the OSR's evaluation of the consistency of the RPP with other AB documents.

The OSR questioned whether the Contractor's citation of implementing documents such as the TFRCM and various DOE IGs implied that they were committing to use the entire documents (RPP5A-Q2). Regarding the TFRCM, the Contractor indicated that they were committed to using the entire document to form the basis of their Radiological Controls Program; however,

only those sections cited in the RPP matrix are enforceable. Regarding the IGs, the Contractor indicated that they are not committed to these documents and that the citations to the documents were intended only to indicate where the information provided in the matrix was derived. The OSR accepts these clarifications because specific measures were identified in the RPP for implementing the requirements of 10 CFR 835.

The OSR found that the status of compliance with each 10 CFR 835 requirement was not stated explicitly. Additionally, the development status of many of the programs cited by the Contractor as implementing provisions was unclear. Consequently, the OSR asked the Contractor to provide additional details on these issues (RPP5A-Q7). The Contractor elected to address this issue by adding two Appendixes to the RPP (Appendix B and C). Appendix B contains the compliance status for each 10 CFR 835 requirement. It also provides actions and the general schedule to achieve compliance where the program is not in full compliance. Appendix C contains a general compliance status for the specific programs necessary for a radiation safety program. It also provides the major sub-elements of each of those programs and the schedule for their development and implementation.

The OSR questioned whether plans or measures had been developed to define the structure, roles, and responsibilities of the radiation protection organization (RPP5A-Q6). The OSR's concerns in this area were directly related to finding reasonable assurance that the 10 CFR 835 requirements will be implemented effectively. The Contractor indicated that this issue is addressed by Articles 141, 142.1, and 142.2 of HNF-5183, which it has committed to as implementing provisions. Although the referenced articles reflect only a portion of the TFRCM statements regarding the radiation protection organization (e.g., they did not reference 142.3, 143, and 144), the OSR is aware that the Contractor is committed to the entire TFRCM as part of their Radiological Controls Program. Therefore, the OSR has reasonable assurance that the Contractor will maintain a radiation protection organization that will ensure full compliance to 10 CFR 835.

In accordance with Review Criterion 5(b), the OSR reviewers compared the RPP content to information in other AB documentation, including the Safety Requirements Document (SRD), Integrated Safety Management Plan (ISMP), and QAP. The OSR noted several instances in which information or commitments in the RPP conflicted with information in the AB documents. These inconsistencies were noted in the February 1, 2001, questions that the OSR posed to the Contractor (RPP5A-Q24 through RPP5A-Q29). These questions requested that BNI provide a plan of action for addressing these inconsistencies. BNI responded by committing to submit, to the OSR, the appropriate Authorization Basis Amendment Requests by May 25, 2001. The OSR found the above commitment appropriate to resolve the issues discussed in the above questions. Because these inconsistencies were identified, the OSR believes that BNI should evaluate whether additional inconsistencies exist between the RPP and other AB documents.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The OSR performed a detailed review of the RPP, Rev. 5A. The scope of the RPP includes both design and construction activities. The OSR review focused primarily on the plans, schedules, and measures identified for implementing the requirements of 10 CFR 835.

The reviewers determined that the RPP, Rev. 5A, met the review criteria established in the OSR review guidance document. The reviewers found that the RPP addressed all applicable requirements of 10 CFR 835 and contained acceptable measures for achieving compliance with the requirements. Based on its response to OSR questions, BNI has committed to make appropriate changes to the RPP and to other AB documents. As such, the reviewers concluded that, if properly implemented, the RPP, Rev. 5A, when revised in accordance with the commitments made by the Contractor, will achieve compliance with 10 CFR 835.

Based on the results of the review and the Contractor's letters addressing the OSR reviewers' questions, the reviewers recommend that the Safety Regulation Official approve the RPP, Rev. 5A.

6.0 REFERENCES

01-RU-0032, CHG letter from J. O. Honeyman to W. J. Taylor, ORP, "Submission of the Revised Radiation Protection Program and Request for Closure of Authorization Basis Amendment Request ABAR-W375-00-00011 Through Submission of Authorization Basis Change Notice ABCN-W375-00-00049," CCN 016569C, dated November 28, 2000.

01-RU-0038, ORP letter from W. J. Taylor to M. P. DeLozier, CHG, "Contract No. DE-AC06-99RL14047 - Acceptability Review of the CH2M Hill Hanford Group, Inc. (CHG) Radiation Protection Program (RPP) for Design and Construction, Rev. 5A," dated December 15, 2000.

01-OSR-0003, ORP letter from W. J. Taylor to M. P. DeLozier, CHG, "…Office of Safety Regulation (OSR) Questions Concerning the CH2M Hill Hanford Group, Inc. (CHG) Radiation Protection Program (RPP) for Design and Construction, Revision 5A," dated January 12, 2001.

01-OSR-0025, CHG letter from J. O. Honeyman to W. J. Taylor, ORP, "…CH2M Hill Hanford Group Inc., Response to the Office of Safety Regulation Questions Regarding the Radiation Protection Program, Revision 5A," CCN 017637C, dated January 24, 2001.

01-OSR-0017, ORP letter from W. J. Taylor to M. P. DeLozier, CHG, "…Office of Safety Regulation (OSR) Question Set Two Concerning the CH2M Hill Hanford Group, Inc. (CHG) Radiation Protection Program (RPP) for Design and Construction, Revision 5A," dated February 1, 2001.

01-OSR-0080, BNI letter from R. F. Naventi to W. J. Taylor, ORP, "…Response to the Office of Safety Regulation Second Set of Questions Regarding the Radiation Protection Program, Revision 5A," CCN 018459, dated March 5, 2001.

01-OSR-0094, ORP letter from W. J. Taylor, to R. F. Naventi, BNI, "…Additional Request Regarding the Radiation Protection Program…," dated March 21, 2001.

01-OSR-0117, BNI letter from R. F. Naventi to W. J. Taylor, ORP, "…Response to Office of Safety Regulation Additional Request Regarding the Radiation Protection Program…," CCN 019243, dated April 3, 2001.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

ANSI N323, "Radiation Protection Instrumentation Test and Calibration," American National Standards Institute, 1978.

ANSI N323A, "Radiation Protection Instrumentation Test and Calibration," American national Standards Institute, 1997.

DOE G 441.1-5, *Radiation-Generating Devices Guide*, U.S. Department of Energy, 1999.

DOE G 441.1-11, *Occupational Radiation Protection Record-Keeping and Reporting Guide*, U.S. Department of Energy, 1999.

HNF-5183, *Tank Farms Radiological Control Manual* (TFRCM), CH2M Hill Hanford Group, Inc., Richland, Washington, 2000

PL-W375-N00005, *RPP-WTP ALARA Program*, CH2M Hill Hanford Group, Inc., Richland, Washington, 2000.

RL/REG-98-11, *Guidance for Review of the RPP-WTP Contractor Radiation Protection Program Document Required by 10 CFR 835, Occupational Radiation Protection*, Rev. 2, U.S. Department of Energy, 2000.

RL/REG-2000-16, *Radiation Protection Program (RPP) Planning Handbook*, Rev. 1, U.S. Department of Energy, Richland Operations Office, 2000.

7.0 LIST OF TERMS

AB	authorization basis
ALARA	as low as reasonably achievable
BNI	Bechtel National, Inc.
CFR	Code of Federal Regulations
CHG	CH2M Hill Hanford Group, Inc.
DOE	U.S. Department of Energy
IG	(DOE) Implementation Guide
ISMP	Integrated Safety Management Plan
MOU	Memorandum of Understanding
ORP	Office of River Protection

OSR	Office of Safety Regulation
QAP	Quality Assurance Program
SRD	Safety Requirements Document
RCM	Radiological Control Manager
RPP	Radiation Protection Program
RPP-WTP	River Protection Project Waste Treatment Plant
TFRCM	Tank Farms Radiological Control Manual